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**VOC EMISSION TESTING
ZINK CHARCOAL VAPOR RECOVERY UNIT EXHAUST**

MARATHON OIL

**LEBANON, OHIO
SEPTEMBER 2, 1993
REPORT # 5393**

ANALYTICAL TESTING CONSULTANTS, INC.

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**Issue Date:
September 13, 1993**

I

INTRODUCTION

Marathon Oil of Findlay, Ohio requested that ANALYTICAL TESTING CONSULTANTS, INC. perform a Volatile Organic Compound emission test at the Lebanon, Ohio bulk storage gasoline terminal where a Zink vapor control unit is in operation. This test was to be performed in accordance with USEPA Method 25B.

The purpose of this test was to determine the volatile organic compound (VOC) emission rate of the unit and compare those to the applicable emission rate regulation.

Section II contains the RESULTS, CONCLUSIONS, and RECOMMENDATIONS. Section III has the DESCRIPTION OF TEST. Section IV consists of all the CALCULATIONS, and Section V, the DATA SHEETS, LAB REPORTS, AND CALIBRATION INFORMATION.

zink unit sketch

RESULTS SUMMARY

LOCATION: MARATHON OIL
LEBANON, OHIO
ZINK VRU

DATE: SEPTEMBER 2, 1993

<u>PARAMETER</u>	<u>RESULT</u>
GALLONS LOADED, ACCOUNTABLE GASOLINE	204,742
GALLONS LOADED, TOTAL PRODUCT	264,847
TOTAL NUMBER OF TRUCKS LOADED	35
NUMBER OF LEAKING TRUCKS	0
SYSTEM EXHAUST VOLUME, CUBIC METERS	1196.27
TOTAL MASS EMISSIONS, MG	3,427,634
VOC EMISSION RATE, ACCOUNTABLE GALLONS, MG/L	4.42
OUTLET METHANE CONCENTRATION, PPM	920
VOC EMISSION RATE, METHANE CORRECTED	1.82
AVERAGE OUTLET CONCENTRATION, ppm	1,531
AVERAGE INLET CONCENTRATION, %	31.98
UNIT EFFICIENCY, %	99.25

II

CONCLUSIONS

Results of the testing are shown in the preceding RESULTS SUMMARY. Additional data and information may be reviewed in the CALCULATIONS and DATA SHEETS sections of this report.

The emission rate calculations shown were made utilizing the gallons total loaded on trucks which had less than 20% LEL (10,000 ppm as methane) leak rates as determined with the Bacharach hydrocarbon meter with built in sampling pump. The emission rates were quite good with respect to the allowable of 30.2 mg/l.

Leak tests were performed in accordance with EPA Method 21. The vapor recovery system was traced beginning with the vapor hose connection along the entire above ground portion of the system, checking all flange connections, valves and valve seats, and compound recovery sections. This test was performed while fuel was being loaded. No leaks were detected in any above ground portion of the system.

An analysis for methane concentration in the exhaust vapor was performed. This bag sample was analyzed by Analytical Technologies, Inc. ATI found a concentration of 920 ppm as methane. This reduced the emission rate from 4.42 to 1.82 mg/l. Additionally, an integrated bag sample of the inlet vapors was collected for determinations of inlet concentration. The collection was done via method 18. Leak-checked Tedlar bag samples were collected utilizing a peristaltic pump calibrated to a flow rate of 0.2 liters/min. The lab analysis for these samples are included in the data sheets section of this report. Inlet concentrations were determined to be 319,880 ppm, which yielded an efficiency of 99.25%.

II

RECOMMENDATIONS

ANALYTICAL TESTING CONSULTANTS, INC. recommends that this test report be submitted to the OhioEPA/local regulatory agency as evidence that the Zink charcoal vapor recovery unit in operation at the Lebanon, Ohio bulk storage terminal is meeting or exceeding applicable emission rate regulations.

III

DESCRIPTION OF TEST

The test team consisted of Richard Westbrook and James Whitlock. They immediately finalized the equipment setup at the exhaust of the vapor recovery system upon arrival at the terminal site at 5:45 A.M.

Preliminary measurements and calibration of instrumentation was accomplished and monitoring of the system exhaust began at 6:10 A.M. Testing concluded at 12:10 p.m. after more than 80,000 gallons of gasoline had been loaded and six hours had elapsed.

The methods utilized for testing were as outlined by the USEPA Method 25B. Method 2A was utilized for air volume measurements; Method 25B for the volatile organic compound determination. In addition, a sample of exhaust gases was collected for subsequent laboratory analysis. All calculations were performed utilizing a computer system, data input and report preparation by Keith Poole. Copies of all calculation formula appear in the CALCULATIONS section of this report.

A Rockwell Turbine Gas Meter, Model T-60 Mark II, equipped with a thermocouple and static pressure tap connected to a Dwyer slack tube manometer was utilized for the Method 2A volume determination.

An Horiba non-dispersive infrared analyzer was utilized for the volatile organic compound monitoring. During the monitoring, the analyzer was connected to an Omega 10" Strip Chart Recorder to provide a record of the hydrocarbon concentration. Instrument calibration was accomplished utilizing certified mixtures of propane diluted with nitrogen. The span gas was 10% propane, hi-range was 8.51%, the mid-range was 5%, the low range was 3%, and high purity nitrogen was the zero gas.

During testing, observations were made on each truck which loaded. Trucks without current vapor tightness certification stickers did not load during the monitoring period. Please refer to the Data Sheets section for information regarding specific trucks.

IV

CALCULATIONS

Calculation Formulae
Calibration Error Determination
VOC Calculation
Emission Rate Calculation

CALCULATIONS

$$1. \quad V_{es} = (.3853) (G) (.0283) (V_m) (P_g + P_b)/T_m$$

Where

V_{es} = Standard volume of air-vapor mixture, cubic meters

G = Gas meter coefficient (1)

V_m = Net gas meter volume, cubic feet

P_g = Static pressure, mm Hg

P_b = Atmospheric pressure, mm Hg

T_m = Absolute temperature at meter

$$2. \quad C_e = (K_2) (\text{chart reading})$$

Where

C_e = VOC concentration as measured, ppmv

K₂ = Constant from instrument calibration

Chart reading = 5 minute average peak height, mm

$$3. \quad M_e = (K)(V_{es})(C_e)/1000000$$

Where

K = 1830000 (propane calibration)

$$4. \quad E = M_e/L$$

Where

E = emission rate of VOC, mg/L

L = Liters of gasoline loaded during test period

$$5. \quad E_c = (M_e - M \text{ Methane})/L$$

Where

E_c = Emission rate corrected for methane concentration

M Methane = Mass of methane emitted during the test period

SYSTEM CALIBRATION ERROR DATA

CLIENT Marathon Oil
 LOCATION Lebanon, Ohio
 SPAN VALUE 12.5% (100 unit)
 METHOD 250

 DATE 9/2/93
 CAL GAS propane in N2
 START TIME 6:10 AM
 ANALYZER HORIBA 2010

INITIAL CALIBRATION

RANGE	CONCENTRATION	PREDICTED CHART	ACTUAL CHART	% ERROR
ZERO	0	0	0	
LOW	3.0	24.0	24.0	0
MID	5.0	40.0	40.5	1.25
HIGH	8.51	68.1	67.4	1.0
SPAN	10.0	80.0	80.0	

$K_2 = \text{ACTUAL CHART OF SPAN/SPAN CONCENTRATION} = \text{PPM OR \% / UNIT}$
 ERROR = (PREDICTED-ACTUAL)/PREDICTED X 100

*PREDICTED MINUS ACTUAL SHOULD BE TAKEN AS ABSOLUTE VALUE!

HOURLY SPAN AND ZERO CHECKS

TIME	ZERO			MID		
	PREDICTED	ACTUAL	% ERROR	PREDICTED	ACTUAL	% ERROR
1	0	0	0	40.0	40.1	0.1
2	0	0	0	40.0	40.2	0.2
3	0	0.1	0.1	40.0	40.1	0.1
4	0	0.1	0.1	40.0	40.3	0.3
5	0	0	0	40.0	40.1	0.1
FINAL	0	1	1.0	40.0	40.0	0

ALLOWABLE INITIAL CALIBRATION ERROR = +5%

ALLOWABLE HOURLY CALIBRATION ERROR AND DRIFT = +3%

Inlet

SYSTEM CALIBRATION ERROR DATA

CLIENT Marathon O:1 DATE 9/2/93
 LOCATION Lubbock, Ohio CAL GAS propane in N₂
 SPAN VALUE 40% (100 units) START TIME —
 METHOD 25B ANALYZER Hewlett 2016

INITIAL CALIBRATION

RANGE	CONCENTRATION	PREDICTED CHART	ACTUAL CHART	% ERROR
ZERO	0	0	0	
LOW	8.51	21.3	21.1	0.9
MID	10.0	25.0	25.4	1.6
HIGH	19.5	48.8	49.2	0.8
SPAN	32.0	80.0	80.0	

K₂ = ACTUAL CHART OF SPAN/SPAN CONCENTRATION= PPM OR %/UNIT

%ERROR = (PREDICTED-ACTUAL)/PREDICTED X 100*

*PREDICTED MINUS ACTUAL SHOULD BE TAKEN AS ABSOLUTE VALUE!

HOURLY SPAN AND ZERO CHECKS

		ZERO			MID	
TIME	PREDICTED	ACTUAL	% ERROR	PREDICTED	ACTUAL	% ERROR
FINAL						

ALLOWABLE INITIAL CALIBRATION ERROR = +5%

ALLOWABLE HOURLY CALIBRATION ERROR AND DRIFT = +3%

VOC CALCULATION
MARATHON OIL
LEBANON, OHIO

DATE 9/2/93
P BAR 29.3
K2 1250

TIME	METER	NET VOL	PG	Tm F	Tm C	Ves	CHART	R	Ce	Mei
610	5540	800	0	68	20	22.09		1	1250	50535.42
615	6340	1100	6	68	20	30.83	0.9	1125	63479.2	
620	7440	675	4	68	20	18.83	1	1250	43067.27	
625	8115	175	0	67	19	4.84	1	1250	11075.63	
630	8290	40	0	67	19	1.11	1	1250	2531.572	
635	8330	990	0	68	20	27.34	1.3	1625	81298.85	
640	9320	220	0	69	21	6.06	1.3	1625	18032.21	
645	9540	10	0	68	20	0.28	1.1	1375	694.862	
650	9550	490	0	68	20	13.53	1	1250	30952.94	
655	10040	1020	0	69	21	28.11	1	1250	64310.69	
700	11060	950	0.4	68	20	26.26	1.6	2000	96113.68	
705	12010	610	0.5	67	19	16.90	3.1	3875	119830.2	
710	12620	1460	0.2	68	20	40.34	3	3750	276820.3	
715	14080	985	1.4	71	22	27.14	0.8	1000	49669.67	
720	15065	1055	0.4	70	21	29.05	1	1250	66458.4	
725	16120	590	0.4	69	21	16.28	1	1250	37236.66	
730	16710	655	0	69	21	18.05	1	1250	41297.55	
735	17365	40	0	69	21	1.10	1.4	1750	3530.783	
740	17405	220	0	69	21	6.06	1	1250	13870.93	
745	17625	95	0	69	21	2.62	1	1250	5989.721	
750	17720	665	0	69	21	18.33	0.9	1125	37735.24	
755	18385	1490	0.5	70	21	41.04	0.7	875	65718.94	
800	19875	460	0.6	70	21	12.67	0.5	625	14495.83	
805	20335	10	0	70	21	0.28	0.5	625	314.6529	
810	20345	945	0	70	21	26.00	0.5	625	29734.7	
815	21290	60	0.4	69	21	1.66	0.5	625	1893.39	
820	21350	700	0	69	21	19.29	0.9	1125	39721.31	
825	22050	865	0.2	70	21	23.81	1	1250	54462.27	
830	22915	695	0.5	71	22	19.11	0.9	1125	39338.14	
835	23610	655	0.6	70	21	18.05	0.7	875	28897.11	
840	24265	940	0.4	70	21	25.89	0.7	875	41449.88	
845	25205	615	0.3	71	22	16.90	0.9	1125	34792.56	
850	25820	1025	0.8	72	22	28.15	1	1250	64390.02	
855	26845	295	0	71	22	8.10	1	1250	18529.51	
900	27140	300	0.2	71	22	8.24	1.2	1500	22623.63	
905	27440	745	0.3	72	22	20.43	1.2	1500	56090.34	
910	28185	150	0.2	75	24	4.09	1	1250	9355.939	
915	28335	0	0	76	24	0.00	0.5	625	0	
920	28335	0	0	76	24	0.00	0.5	625	0	
925	28335	930	0	76	24	25.30	1	1250	57869.41	
930	29265	375	0.4	75	24	10.23	1	1250	23401.58	
935	29640	290	0.2	75	24	7.91	1	1250	18088.15	
940	29930	435	0	76	24	11.83	1	1250	27067.95	
945	30365	355	1	77	25	9.66	0.7	875	15472.85	
950	30720	920	0.2	77	25	24.99	0.7	875	40018.36	
955	31640	965	0.5	78	26	26.19	0.7	875	41929.18	
1000	32605	940	0.6	78	26	25.51	0.8	1000	46689.34	
1005	33545	845	0.5	79	26	22.89	1	1250	52352.83	
1010	34390	265	0.4	79	26	7.18	1.2	1500	19697.07	
1015	34655	900	0	81	27	24.26	1.4	1750	77678.13	
1020	35555	805	0.5	81	27	21.72	1.3	1625	64596.95	
1025	36360	475	0.4	82	28	12.79	1	1250	29258.66	
1030	36835	80	0.2	81	27	2.16	0.9	1125	4440.978	

VOC CALCULATION
MARATHON OIL
LEBANON, OHIO

DATE 9/2/93
P BAR 29.3
K2 1250

TIME	METER	NET VOL	PG	Tm F	Tm C	Ves	CHART R	Ce	Mei
1035	36915	135	0	81	27	3.64	0.7	875	5825.86
1040	37050	605	0	82	28	16.27	1	1250	37228.93
1045	37655	1035	0.2	83	28	27.80	1.1	1375	69963.97
1050	38690	2150	0.5	83	28	57.80	1.2	1500	158667.4
1055	40840	1040	0.6	84	29	27.92	3.1	3875	197957.4
1100	41880	405	0.8	85	29	10.86	1.2	1500	29801.08
1105	42285	390	0.3	84	29	10.46	1	1250	23928.46
1110	42675	855	0	85	29	22.87	1	1250	52322.78
1115	43530	1190	0.2	85	29	31.85	1.1	1375	80146.08
1120	44720	1085	0.3	85	29	29.05	1.7	2125	112961.4
1125	45805	385	0.8	85	29	10.32	4.3	5375	101513.8
1130	46190	615	0.4	85	29	16.47	5	6250	188367.3
1135	46805	0	0.1	86	30	0.00	1.8	2250	0
1140	46805	645	0.2	86	30	17.23	1.2	1500	47302.75
1145	47450	865	0.2	85	29	23.15	1	1250	52961.31
1150	48315	545	0	84	29	14.61	1.5	1875	50120.01
1155	48860	480	0.3	84	29	12.87	1.9	2375	55955.79
1200	49340	35	0	83	28	0.94	2.3	2875	4944.466
1205	49375	25	0	83	28	0.67	1.8	2250	2763.987
1210	49400	END TEST	TOTALS			1196.27		1531	3427634

EMISSION RATE CALCULATION

LOCATION MARATHON OIL
LEBANON, OHIO
9/2/93

SUM Mei	GALLONS	LITERS	EMISSION RATE	METHANE CONC	SUM Ves
3427634	204742	774948.5	4.423048	920	1196.27

EMISSION RATE, METHANE CORRECTED

1.824113

VR UNIT EFFICIENCY CALCULATION

Ves* GALLONS 204742 CUBIC METERS	Ce AVERAGE INLET CONCENTRATION PPMV AS PROPANE	Me (in) TOTAL ORGANIC INLET MASS MILLIGRAMS	Me (out) MILLIGRAMS EMITTED	EFFICIENCY %
775.9722	319880	454238905	3427634	99.25

*GALLONS PUMPED X 3.79E-03 M3/GALLON

V

DATA SHEETS

Volume Flow Rate Measurements
Truck Loading Log
Terminal Information
Laboratory Report
Calibration Data
Strip Charts

319880

ANALYTICAL TESTING CONSULTANTS, INC.

VOLUME FLOW RATE MEASUREMENT DATA SHEET

PLANT Marathon O.I. DATE 9/2/93SAMPLING LOCATION Lebanon OhioOPERATORS RW, JW METER # 810555P_{BAR}, Hg 29.30 UNIT ALLOWABLE 30.2 EFFICIENCY 55%, /1METER CALIBRATION COEFFICIENT 1.00 TYPE OF UNIT Zink

TIME RUN/CLOCK	VOLUME METER READING	STATIC PRESSURE	TEMPERATURE F°	REMARKS
00 6:10	5540	0	68	STANT TEST
05	6340	6.0	68	
10	7440	4.0	68	
15	8115	0	67	
20	8290	0	67	
25	8330	0	68	
30 6:40	9320	0	69	
35	9540	0	68	
40	9550	0	68	
45	10040	0	69	
50	11060	0.4	68	
55	12010	0.5	67	
1:00 7:10	12620	0.2	68	zero/span check
05	14080	1.4	71	
10	15065	0.4	70	
15	16120	0.4	69	
20	16710	0	69	
25	17365	0	69	
30 7:40	17405	0	69	
35	17625	0	69	
40	17720	0	69	
45	18385	0.5	70	
50	19875	0.6	70	
55	20335	0	70	
2:00 8:10	20345	0	70	zero/span check

ANALYTICAL TESTING CONSULTANTS, INC.

VOLUME FLOW RATE MEASUREMENT DATA SHEET

PLANT Marathon Oil DATE 9/2/93SAMPLING LOCATION Lebanon, OhioOPERATORS RW, JA METER # 810 555P_{BAR}, Hg 29.30 UNIT ALLOWABLE 30.2 mg/l EFFICIENCY 100%METER CALIBRATION COEFFICIENT 1.00 TYPE OF UNIT Zink

TIME RUN/CLOCK	VOLUME METER READING	STATIC PRESSURE	TEMPERATURE F°	REMARKS
2:00 7:15	21290	0.4	69	
10	21350	0	69	
15	22050	0.2	70	
20	22915	0.5	71	
25	23610	0.6	70	
30 8:40	24265	0.4	70	
35	25205	0.3	71	
40	25820	0.8	72	
45	26845	0	71	
50	27140	0.2	71	
55	27440	0.3	72	
3:00 9:10	28185	0.2	75	zero/span check
05	28335	0	76	
10	28335	0	76	
15	28335	0	76	
20	29265	0.4	75	
25	29640	0.2	75	
30 9:40	29930	0	76	
35	30365	1.0	77	
40	30720	0.2	77	
45	31640	0.5	78	
50	32605	0.6	78	
55	33545	0.5	79	
4:00 10:10	34390	0.4	79	zero/span check
05	34655	0	81	

ANALYTICAL TESTING CONSULTANTS, INC.

VOLUME FLOW RATE MEASUREMENT DATA SHEET

PLANT Marathon O.I. DATE 9/2/93SAMPLING LOCATION Lebanon, OhioOPERATORS PC, JW METER # 810555P_{BAR}, Hg 29.30 UNIT ALLOWABLE 30.2 mg/l EFFICIENCY 100%METER CALIBRATION COEFFICIENT 1.00 TYPE OF UNIT Zink

TIME RUN/CLOCK	VOLUME METER READING	STATIC PRESSURE	TEMPERATURE ° F°	REMARKS
4:10 10:20	35555	0.5	81	
15	36360	0.4	82	
20	36835	0.2	81	
25	36915	0	81	
30 10:40	37050	0	82	
35	37655	0.2	83	
40	38640	0.5	83	
45	39720	0.6	84	
50	40840	0.8	85	
55	41880	0.3	84	
5:00 11:10	42285	0	85	zero/spin check
05	42675	0.2	85	
10	43530	0.3	85	
15	44720	0.8	85	
20	45805	0.4	85	
25	46190	0.1	86	
30 11:40	46805	0.2	86	
35	47450	0.2	85	
40	46315	0	84	
45	48860	0.3	84	
50	49340	0	83	
55	49375	0	83	
6:00 12:10	49400	0	83	zero/spin check

VOC TRUCK INFORMATION DATA SHEET

	ANALYTICAL TESTING CONSULTANTS, INC.			
			DATE	9/2/93
	GASTECH GAS DETECTOR WITH 1.54% PROPANE	CALIBRATED	DATA BY	QW
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
	MARATHON	GASKET BOOT	(GAS)	9050
START		1 0 0	DIESEL/OIL	
6:30		2 0 0	AVGAS	
END		3 0 0	OTHER	
		4 6 0		
	PREVIOUS LOAD GAS	5		
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
	New Paris	GASKET BOOT	GAS	7700
START	T140EK	1	(DIESEL/OIL)	
6:30		2	AVGAS	
END		3	OTHER	
6:40		4		
	PREVIOUS LOAD D	5		
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
	DUNCAN OIL CO	GASKET BOOT	(GAS)	8000
START	T1621DZ	1 0 0	DIESEL/OIL	
6:30		2 0 0	AVGAS	
END		3 0 0	OTHER	
6:45		4 6 0		
	PREVIOUS LOAD GAS	5		
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
	MARATHON OIL CO	GASKET BOOT	(GAS)	9050
START	145398	1 0 0	DIESEL/OIL	
6:45		2 0 0	AVGAS	
END		3 0 0	OTHER	
7:00		4 0 0		
	PREVIOUS LOAD GAS	5		
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
	Shmies Bulk 3021	GASKET BOOT	(GAS)	8700
START	T283HD	1 0 0	DIESEL/OIL	
6:50		2 0 0	AVGAS	
END		3 0 0	OTHER	
7:05		4 0 0		
	PREVIOUS LOAD GAS	5		

PMS 1

VOC TRUCK INFORMATION DATA SHEET

ANALYTICAL TESTING CONSULTANTS, INC.

			DATE	9/2/93
	GASTECH GAS DETECTOR WITH 1.54% PROPANE	CALIBRATED	DATA BY	dw
			CHECKED BY	
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
START	New Parc's oil 1618GF	1 0 0	GAS	8400
700		2 0 0	DIESEL/OIL	
END		3 0 0	AVGAS	
710		4 0 0	OTHER	
	PREVIOUS LOAD D	5		
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
START	Marathon oil 141703	1 0 0	GAS	9150
704		2 0 0	DIESEL/OIL	
END		3 0 0	AVGAS	
715		4 6 6	OTHER	
	PREVIOUS LOAD Gas	5		
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
START	Marathon 1419405	1 0 0	GAS	9100
710		2 0 0	DIESEL/OIL	
END		3 0 0	AVGAS	
720		4 0 0	OTHER	
	PREVIOUS LOAD Gas	5		
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
START	Marathon 141701	1 0 0	GAS	9000
715		2 0 0	DIESEL/OIL	
END		3 0 0	AVGAS	
725		4 0 0	OTHER	
	PREVIOUS LOAD Gas	5		
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
START	New Parc's oil	1	GAS	
715		2	DIESEL/OIL	
END		3	AVGAS	
	PREVIOUS LOAD	4	OTHER	
		5		

VOC TRUCK INFORMATION DATA SHEET

	ANALYTICAL TESTING CONSULTANTS, INC.			
			DATE	9/2/93
	GASTECH GAS DETECTOR WITH 1.54% PROPANE		DATA BY	JW
	TIME	TRUCK INFORMATION	%LEL	FUEL TYPE
2		STEPHENSON OIL	GASKET BOOT	GAS
START	1631DL	1 0 0	DIESEL/OIL	
930		2 0 0	AVGAS	
END		3 0 0	OTHER	
940		4 0 0		
	PREVIOUS LOAD	GAS	5	
3	TIME	TRUCK INFORMATION	%LEL	FUEL TYPE
		SPROUTER OIL	GASKET BOOT	GAS
START	T839DB	1	DIESEL/OIL	7500
940		2	AVGAS	
END		3	OTHER	
950		4		
	PREVIOUS LOAD	GAS	5	
10 3 7 AM 4 2	TIME	TRUCK INFORMATION	%LEL	FUEL TYPE
		SPEC MARATHON OIL	GASKET BOOT	GAS
START	145398	1 0 0	DIESEL/OIL	9050
950		2 0 0	AVGAS	
END		3 0 0	OTHER	
1005		4 0 0		
	PREVIOUS LOAD	GAS	5	
3	TIME	TRUCK INFORMATION	%LEL	FUEL TYPE
		MARATHON OIL	GASKET BOOT	GAS
START	141701	1 0 0	DIESEL/OIL	9150
950		2 0 0	AVGAS	
END		3 0 0	OTHER	
1005		4 0 0		
	PREVIOUS LOAD	GAS	5	
3	TIME	TRUCK INFORMATION	%LEL	FUEL TYPE
		OWENSVILLE SUPPLY	GASKET BOOT	GAS
START	T283#D	1 0 0	DIESEL/OIL	8700
1000		2 0 0	AVGAS	
END		3 0 0	OTHER	
1015		4 0 0		
	PREVIOUS LOAD	GAS	5	

VOC TRUCK INFORMATION DATA SHEET

ANALYTICAL TESTING CONSULTANTS, INC.

DATE

9/2/83

DATA BY

JW

CHECKED BY

GASTECH GAS DETECTOR
WITH 1.54% PROPANE

CALIBRATED

FUEL TYPE

GAS

DIESEL/OIL

AVGAS

OTHER

GALLONS

5100

TIME

TRUCK INFORMATION

%LEL

GASKET BOOT

START

1 0 . 6

715

2 0 0

END

3 0 0

730

4 0 0

PREVIOUS LOAD

5

TIME

TRUCK INFORMATION

%LEL

GASKET BOOT

START

1 0 0

MARATHON OIL

130828

END

2 0 0

730

3 0 0

PREVIOUS LOAD

GAS

4 0 0

5

TIME

TRUCK INFORMATION

%LEL

FUEL TYPE

GALLONS

START

OWENSBVILLE SUPPLY

1466DC

GAS

8000

750

GASKET BOOT

DIESEL/OIL

END

2

AVGAS

3

OTHER

4

PREVIOUS LOAD

5

TIME

TRUCK INFORMATION

%LEL

FUEL TYPE

GALLONS

START

MARATHON OIL

141702

GAS

9000

750

GASKET BOOT

DIESEL/OIL

END

1

AVGAS

805

2

OTHER

3

PREVIOUS LOAD

4

TIME

TRUCK INFORMATION

%LEL

FUEL TYPE

GALLONS

START

REYNOR'S SPOT

GAS

7700

800

1

DIESEL/OIL

END

2

AVGAS

815

3

OTHER

4

PREVIOUS LOAD

MOTOR OIL

5

VOC TRUCK INFORMATION DATA SHEET

	ANALYTICAL TESTING CONSULTANTS, INC.			
			DATE	9/2/93
	GASTECH GAS DETECTOR WITH 1.54% PROPANE		DATA BY	QWS
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
	MARATHON OIL	GASKET BOOT	(GAS)	7950
START		100	DIESEL/OIL	1100
815		200	AVGAS	
END		300	OTHER	
830		400		
	PREVIOUS LOAD Gas	5		
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
	DUNCAN OIL	GASKET BOOT	(GAS)	5000
START	T164DZ	160	DIESEL/OIL	
830		260	AVGAS	
END		360	OTHER	
845		460		
	PREVIOUS LOAD Gas	5		
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
	MARATHON	GASKET BOOT	(GAS)	950
START	141700	100	DIESEL/OIL	
830		200	AVGAS	
END		300	OTHER	
840		400		
	PREVIOUS LOAD Gas	5		
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
	Premier Tanklines	GASKET BOOT	(GAS)	6000
START	T655DS	1	DIESEL/OIL	
840		2	AVGAS	
END		3	OTHER	
855		4		
	PREVIOUS LOAD D	5		
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
	Surety Exportation	GASKET BOOT	(GAS)	8700
START	10722	100	DIESEL/OIL	
850		200	AVGAS	
END		300	OTHER	
910		400		
	PREVIOUS LOAD Gas	5		

VOC TRUCK INFORMATION DATA SHEET

	ANALYTICAL TESTING CONSULTANTS, INC.			
			DATE	9/2/03 JW
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
START	Suburban oil T827D8	1	GASKET BOOT <input checked="" type="checkbox"/> DIESEL/OIL	7000
1615		2	AVGAS	
END		3	OTHER	
1025		4		
	PREVIOUS LOAD motor oil	5		
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
START	Marathon oil 130328	100	GASKET BOOT <input checked="" type="checkbox"/> GAS	9650
1020		200	DIESEL/OIL	
END		300	AVGAS	
1030		400	OTHER	
	PREVIOUS LOAD Gas	5		
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
START	Emory T718D9	1	GASKET BOOT <input checked="" type="checkbox"/> GAS	5600
1045		2	DIESEL/OIL	
END		3	AVGAS	
1055		4	<input checked="" type="checkbox"/> OTHER kcr	1800
	PREVIOUS LOAD Gas	5		
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
START	Marathon oil 1411700	100	GASKET BOOT <input checked="" type="checkbox"/> GAS	9150
1050		200	DIESEL/OIL	
END		300	AVGAS	
1100		400	OTHER	
	PREVIOUS LOAD Gas	5		
TIME	TRUCK INFORMATION	%LEL	FUEL TYPE	GALLONS
START	Deco Export T657HV	1	GASKET BOOT <input checked="" type="checkbox"/> GAS	7500
1050		2	DIESEL/OIL	
END		3	AVGAS	
1100		4	OTHER	
	PREVIOUS LOAD Gas	5		

VOC TRUCK INFORMATION DATA SHEET

	ANALYTICAL TESTING CONSULTANTS, INC.			
			DATE	9/2/93
	GASTECH GAS DETECTOR WITH 1.54% PROPANE		DATA BY	JW
	TIME	TRUCK INFORMATION	%LEL	FUEL TYPE
1		MARATHON OIL	GASKET BOOT	GAS
1	START	1411703	1 0 0	DIESEL/OIL
1		1650	2 0 0	AVGAS
1	END		3 0 0	OTHER
1		1105	4 0 0	
1		PREVIOUS LOAD Gas	5	
2	TIME	TRUCK INFORMATION	%LEL	FUEL TYPE
2		MARATHON	GASKET BOOT	GAS
2	START	149383	1 0 0	DIESEL/OIL
2		1100	2 0 0	AVGAS
2	END		3 0 0	OTHER
2		1110	4 0 0	
2		PREVIOUS LOAD Gas	5	
1	TIME	TRUCK INFORMATION	%LEL	FUEL TYPE
1		Georgetown	GASKET BOOT	GAS
1	START	T466DC	1 0 0	DIESEL/OIL
1		1115	2 0 0	AVGAS
1	END		3 0 0	OTHER
1		1125	4 0 0	
1		PREVIOUS LOAD D	5	
2	TIME	TRUCK INFORMATION	%LEL	FUEL TYPE
2		New Paris OIL	GASKET BOOT	GAS
2	START	T618GF	1 0 0	DIESEL/OIL
2		1120	2 0 0	AVGAS
2	END		3 0 0	OTHER
2		1130	4 0 0	
2		PREVIOUS LOAD Gas	5	
	TIME	TRUCK INFORMATION	%LEL	FUEL TYPE
		MARATHON OIL	GASKET BOOT	GAS
	START	149405	1 0 0	DIESEL/OIL
		1120	2 0 0	AVGAS
	END		3 0 0	OTHER
		1130	4 0 0	
		PREVIOUS LOAD Gas	5	

VOC TRUCK INFORMATION DATA SHEET

ANALYTICAL TESTING CONSULTANTS, INC.

DATE

9/2/93

DATA BY

JW

CHECKED BY

GASTECH GAS DETECTOR
WITH 1.54% PROPANE

CALIBRATED

FUEL TYPE

GAS

GALLONS

9000

DIESEL/OIL

AVGAS

OTHER

TIME TRUCK INFORMATION %LEL

MACATHON

GASKET BOOT

START

141701

1 60

1150

2 00

END

3 06

4 60

PREVIOUS LOAD Gas

5

TIME TRUCK INFORMATION %LEL

MACATHON

GASKET BOOT

START

141702

1 00

1150

2 00

END

3 00

4 00

PREVIOUS LOAD Gas

5

TIME TRUCK INFORMATION %LEL

GASKET BOOT

START

1

2

3

4

PREVIOUS LOAD

5

TIME TRUCK INFORMATION %LEL

GASKET BOOT

START

1

2

3

4

PREVIOUS LOAD

5

TIME TRUCK INFORMATION %LEL

GASKET BOOT

START

1

2

3

4

PREVIOUS LOAD

5

FUEL TYPE

GAS

GALLONS

9000

DIESEL/OIL

AVGAS

OTHER

FUEL TYPE

GAS

GALLONS

DIESEL/OIL

AVGAS

OTHER

FUEL TYPE

GAS

GALLONS

DIESEL/OIL

AVGAS

OTHER

FUEL TYPE

GAS

GALLONS

DIESEL/OIL

AVGAS

OTHER

103	68815.000	67889.000	0
104	15483.000	15342.000	0
105	3751.000	3714.000	0
107	18175.000	18042.000	0
109	5502.000	5451.000	0
122	1800.000	1787.000	0
125	42204.000	41747.000	0
176	3907.000	3877.000	0

COMM NET LBS NET TONS NET GALS

~~1004520
116811~~

9/6/21

GAS

Start @ 6:00 AM To 8:00 AM

Marathon Oil Company
999 W. St. Rt. 122
Lebanon, OH 45036-0027

88,309

116 4/33 8:00 To 12:00 PM

204,742 Total Gas

353135

337634

Start @ 6:00 AM

0.1

15,501 0.1

44604

60,105

0.1

8:00 To 12:00 PM

Total 0.1

NATIONAL SPECIALTY GASES

DIVISION OF NATIONAL WELDERS SUPPLY CO., INC.
CERTIFICATE OF ANALYSIS

P. O. Box 12013
Research Triangle Park, N.C. 27709
Phone 919/544-3772

TO: NATIONAL WELDERS
SALISBURY NC

DATE REPORTED: 6/18/91
REFERENCE: 88-12521

MATERIAL SUBMITTED: PROPANE IN NITROGEN
CERTIFIED CYLINDER #CC98108

INFORMATION REQUESTED: RATIO ANALYSIS

METHOD OF ANALYSIS: GAS CHROMATOGRAPH

RESULT OF INVESTIGATION:

<u>COMPONENT</u>	<u>SPECIFICATION</u>	<u>CONCENTRATION</u>
C3H8	3%	3.00%
N2	BALANCE	

Richie

AUTHORIZED SIGNATURE

"THIS REPORT STATES ACCURATELY THE RESULTS OF THE INVESTIGATION MADE UPON THE MATERIALS SUBMITTED TO THE ANALYTICAL LABORATORY. EVERY EFFORT HAS BEEN MADE TO DETERMINE OBJECTIVELY, THE INFORMATION REQUESTED: HOWEVER, IN CONNECTION WITH ITS RENDERING OF THIS REPORT, NATIONAL SPECIALTY GASES SHALL HAVE NO LIABILITY IN EXCESS OF ITS ESTABLISHED CHARGE FOR THE SERVICE. ANY USE OF THIS REPORT OR THE INFORMATION CONTAINED HEREIN SHALL BE AT THE SOLE RISK OF THE USER."

NATIONAL / **SPECIALTY GASES**

DIVISION OF NATIONAL WELDERS SUPPLY CO., INC.
CERTIFICATE OF ANALYSIS

P. O. Box 12013
Research Triangle Park, N.C. 27709
Phone 919/544-3772

TO: National Welders
Salisbury, N.C.

DATE REPORTED: 4-27-90
REFERENCE: 88 8137

MATERIAL SUBMITTED: Propane in Nitrogen, Certified Cyl#CC65756

INFORMATION REQUESTED: Ratio analysis

METHOD OF ANALYSIS: Gas chromatograph

RESULT OF INVESTIGATION:

<u>COMPONENT</u>	<u>SPECIFICATION</u>	<u>CONCENTRATION</u>
C ₃ H ₈	5%	5.01%
N ₂		Balance

Timothy E. Phelps

AUTHORIZED SIGNATURE

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NATIONAL SPECIALTY GASES

• UG-15913 RESEARCH TRIANGLE PARK, NC 27709
NE 15th St. 919-327-21

CERTIFICATE OF ANALYSIS

TO: NATIONAL WELDERS
347 TEBURY NC

DATE REPORTED: 06/13/91
REFERENCE: 88-12460

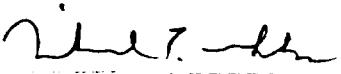
MATERIAL SUBMITTED: PROPANE IN NITROGEN
CERTIFIED CYLINDER #00103338

INFORMATION REQUESTED: RATIO ANALYSIS

METHOD OF ANALYSIS: GAS CHROMATOGRAPH

RESULT OF INVESTIGATION:

COMPONENT	SPECIFICATION	CONCENTRATION
CH ₃	8.5%	8.51%
N ₂	BALANCE	

 AUTHORIZED SIGNATURE

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NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC 27713
(919) 544-3772

TO: NATIONAL WELDERS
SALISBURY, NC

CERTIFICATE OF ANALYSIS

DATE REPORTED: 2/25/92

REFERENCE #: 88-16152

MATERIAL SUBMITTED: PROPANE IN NITROGEN
CERTIFIED CYLINDER #CC109761

INFORMATION REQUESTED: RATIO ANALYSIS

METHOD OF ANALYSIS: GAS CHROMATOGRAPH

RESULT OF INVESTIGATION:

<u>COMPONENT</u>	<u>SPECIFICATION</u>	<u>CONCENTRATION</u>
PROPANE	10%	10.0%
N2	BALANCE	

Mike J. L.
AUTHORIZED SIGNATURE

"THIS REPORT STATED ACCURATELY THE RESULTS OF THE INVESTIGATION MADE UPON THE MATERIAL SUBMITTED TO THE ANALYTICAL LABORATORY. EVERY EFFORT HAS BEEN MADE TO DETERMINE OBJECTIVELY THE INFORMATION REQUESTED; HOWEVER, IN CONNECTION WITH ITS RENDERING OF THIS REPORT, NATIONAL SPECIALTY GASES SHALL HAVE NO LIABILITY IN EXCESS OF ITS ESTABLISHED CHARGE FOR THE SERVICE. ANY USE OF THIS REPORT OR THE INFORMATION CONTAINED HEREIN SHALL BE AT THE SOLE RISK OF THE USER."

NATIONAL SPECIALTY GASES

P.O. BOX 2903 PINEBROOK INDUSTRIAL PARK, NJ 07058
PHONE: (201) 544-3777

CERTIFICATE OF ANALYSIS

TO: DUSTY C. WILDER
5041 TUESDAY DR.

DATE REPORTED: 3/20/73
REFERENCE: 80-10466

MATERIAL SUBMITTED: PROPANE IN NITROGEN
CERTIFIED CYLINDER # DC 36873

INFORMATION REQUESTED: RATIO ANALYSIS

METHOD OF ANALYSIS: GC: CHROMATOGRAPH

RESULT OF INVESTIGATION:

<u>COMPONENT</u>	<u>SPECIFICATION</u>	<u>CONCENTRATION</u>
C3H8	20%	19.5%
ND	BALANCE	

AUTHORIZED SIGNATURE

"THIS REPORT STATES ACCURATELY THE RESULTS OF THE INVESTIGATION
NAME UPON THE MATERIALS SUBMITTED TO THE ANALYTICAL LABORATORY.
EVERY EFFORT HAS BEEN MADE TO DETERMINE OBJECTIVELY THE
INFORMATION REQUESTED; HOWEVER, IN CONNECTION WITH ITS RENDERING
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IN EXCESS OF ITS ESTABLISHED CHARGE FOR THE SERVICE. ANY USE OF
THIS REPORT OR THE INFORMATION CONTAINED HEREIN SHALL BE AT THE
SOLE RISK OF THE USER."

ANALYTICAL TESTING CONSULTANTS, INC

BAROMETER #1 CALIBRATION

DATE/TIME	STATION PRES.	BAR.	READING	ADJUSTMENT	INIT
7/10/92	29.41		29.41	0	DF
8/25/92	29.80		29.83	0.03	JW
9/10/92	29.98		29.98	0	RNW
10/21/92	30.11		30.11	0	CDM
11/19/92	29.17		29.16	0.01	SM
12/4/92	29.43		29.43	0	WKP
1/12/93	29.39		29.46	0.07	SM
2/9/93	29.47		29.47	0	JW
3/5/93	29.77		29.79	0.02	SM
4/5/93	29.38		29.43	0.05	JW
5/14/93	29.75		29.75	0	KP
6/22/93	29.98		29.98	0	SM
7/10/93	29.46		29.51	0.05	SM

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

"PRELIMINARY RESULTS ONLY"

Accession: 309198
Client: ANALYTICAL TESTING COMS.
Project Number: N/S
Project Name: MARATHON OIL
Project Location: LEBANON, OHIO
Test: METHANE
Analysis Method: ATI/GC/FIX
Extraction Method: N/A
Matrix: AIR
QC Level: I

Lab Id: 002 Sample Date/Time: 02-SEP-93 N/S
Client Sample Id: OUTLET Received Date: 07-SEP-93

Batch: GEA254 Dilution Factor: 1 Extraction Date: N/A
Blank: A Dry Weight %: N/A Analysis Date: 10-SEP-93

Parameter:	Units:	Results:	Rpt Lmts:	Q:
METHANE	PPMV	920	0.05	
ANALYST	INITIALS	RP		

Comments:

Project Manager: CAC 9/10

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, N.C. 27713
(919) 544-3772

TO: NATIONAL WELDERS
SALISBURY, NC

CERTIFICATE OF ANALYSIS

DATE REPORTED: 4-30-93

REFERENCE #: 88-23912

MATERIAL SUBMITTED: PROPANE IN NITROGEN, CERTIFIED CYLINDER
#CC103289

INFORMATION REQUESTED: RATIO ANALYSIS

METHOD OF ANALYSIS: GAS CHROMATOGRAPH

RESULT OF INVESTIGATION:

<u>COMPONENT</u>	<u>SPECIFICATION</u>	<u>CONCENTRATION</u>
C3H8	32%	32.0%
N2		BALANCE

John Rose
AUTHORIZED SIGNATURE

"THIS REPORT STATED ACCURATELY THE RESULTS OF THE INVESTIGATION MADE UPON THE MATERIAL SUBMITTED TO THE ANALYTICAL LABORATORY. EVERY EFFORT HAS BEEN MADE TO DETERMINE OBJECTIVELY, THE INFORMATION REQUESTED; HOWEVER, IN CONNECTION WITH ITS RENDERING OF THIS REPORT, NATIONAL SPECIALTY GASES SHALL HAVE NO LIABILITY IN EXCESS OF ITS ESTABLISHED CHARGE FOR THE SERVICE. ANY USE OF THIS REPORT OR THE INFORMATION CONTAINED HEREIN SHALL BE AT THE SOLE RISK OF THE USER."

**TURBINE METER CALIBRATION
8" METER #810555**

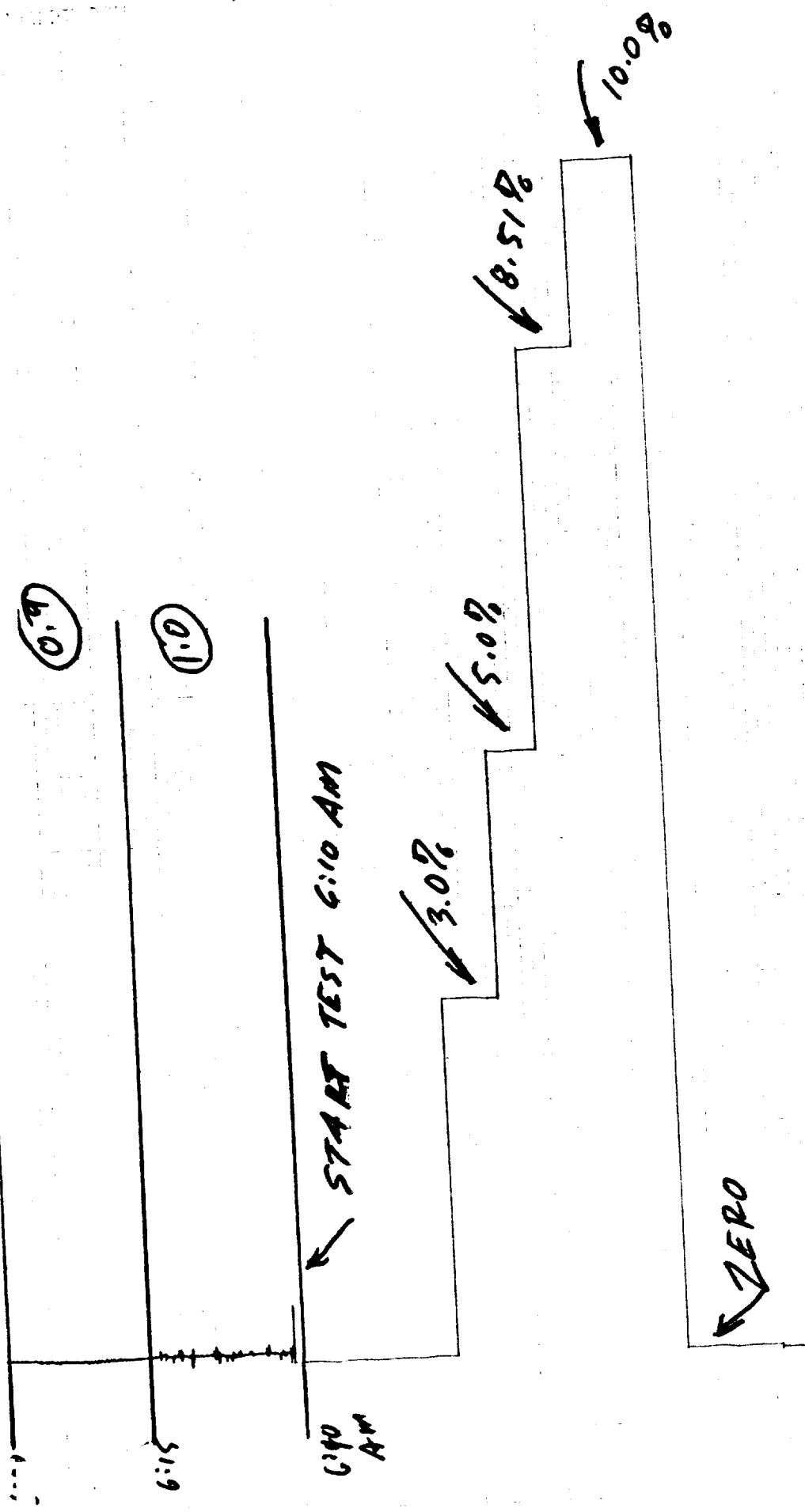
DATE 2/26/93

Pbar 29.41

POSTTEST METER CALIBRATION
8" METER 810555

DATE 9/8/93
Pbar 29.93

RUN #	ENDING	BEGIN	TIME	SP	C	REF.	VOL.
					TEMP.		
1	37964	10985	30	5.1	19	27510	1.007064
2	65147	37989	30	5.1	19	27510	1.000427
3	92451	65258	30	5.1	20	27510	0.999139



Marathon 0:1
Lebanon, Ohio
9/2/93

Chart Speed 30 cm/Hz

(1.0)

(1.0)

(1.1)

(1.3)

(1.3)

(1.0)

(1.0)

(1.0)

7:0

٢٣:٦

٢٣:٦

٢٤:٦

٢٤:٦

٢٣:٦

٢٣:٦

٢٣:٦

٢٣:٦

7:40

1.4

1.0

1.0

1.0

0.8

3.0

3.1

1.6

5% Span Gas

ZERO →

7:35

7:41

7:42

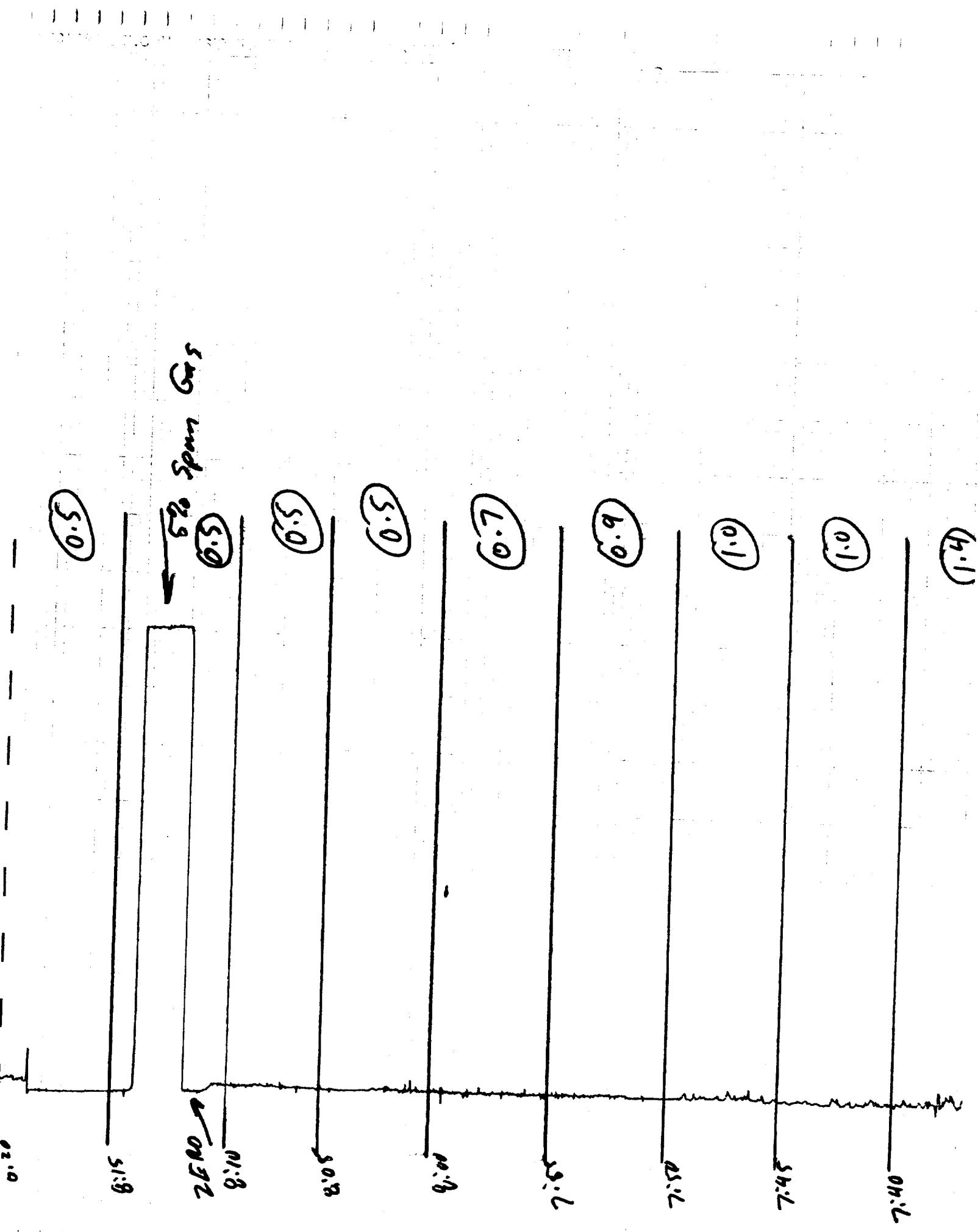
7:40

7:45

7:10

7:05

7:00



1.0

1.0

0.9

0.7

0.7

0.9

1.0

6.9

4.005

8.150

8.150

8.145

8.140

8.135

8.130

8.125

8.120

4:40

1.0

1.0

1.0

0.5

0.5

→ Stop Span Gyr

1.0

1.2

1.2

1.0

9:35

9:30

9:25

9:20

9:15

9:10

9:05

9:00

